

MULTIPLE INDEPENDENT IMPLICIT PERSONALITY PROCESSES:
A CHALLENGE TO DUAL PROCESS THEORY

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MULTIPLE INDEPENDENT IMPLICIT PERSONALITY PROCESSES:
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To my father, Fred H. Brooks, who passed away after learning that I was accepted to the Doctoral Program in I/O Psychology at Georgia Tech. A long time Georgia Tech fan and supporter, he was so proud. To my mother, Grace C. Brooks, who is still proud. And to my children, Adrian, James, and Spencer, who is older than some of my professors and who also returned to college to complete his BA degree. Our family motto: Never give up! Most importantly, to my wife, Wanda DeVaughn, who stood by me and held my hand during this wacky midlife endeavor. It is wonderful to have people who love you. To my whole clan, I dedicate this thesis.

Also, although it may seem a bit unusual, I dedicate this thesis to Dr. Larry James, without whose support and confidence in me, I would still be enslaved by the many-headed dragons and demons of the dreaded bureaucracy. Thanks for believing in me.

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SUMMARY

This study applied the Process Dissociation Procedure (Bornstein, 2002) to test independence between personality processes represented by different implicit measurement techniques. In contrast to the commonly adopted literal view of dual processes in personality theory, the study predicted that two implicit measures (CRT-A and IAT-A) and one explicit measure (NEO-AH) of aggressive disposition would dissociate with each other in their 1) intercorrelations, 2) predictions of behavioral criteria of aggressiveness, and 3) potential moderation by situational cues. These hypotheses were generally, though not completely, supported. Most importantly, the two implicit measures dissociated in their lack of correlation and differential prediction of behavioral criteria, unaffected by changes in situational cues. As predicted, the CRT-A and the NEO-AH dissociated in their intercorrelations, predictions, and moderation by incentives. The IAT-A and the NEO-AH dissociated in their lack of intercorrelation and their differential moderation by changes in incentive conditions. As predicted, only the explicit measure was moderated by changes in incentive conditions. Unexpectedly, IAT-A and the NEO-AH were statistically indistinguishable in their prediction of behavioral criteria of aggression. The findings provided strong support for the hypotheses predicting multiple independent implicit personality processes.

CHAPTER 1

INTRODUCTION

Dual process theories occur across wide ranging areas of psychological research – including personality. A conscious (explicit) process measured by self-reports is typically contrasted with an unconscious (implicit) process measured by indirect means (Bornstein, 2002; Fazio & Olson, 2003; Smith & DeCoster, 2000; Wilson & Dunn, 2004). Social cognition researchers generally agree that the two systems operate by different principles in determining behavior (Deutsch & Strack, 2006). The conscious involves intentional and controlled processes that are available for verbal report, whereas the unconscious involves automatic and involuntary processes that are normally inaccessible to conscious awareness (Bargh & Morsella, 2008).

Intriguingly, the findings of the researchers in the various fields are “remarkably consistent from theory to theory”, so much so, in fact, that some have attempted to formulate a “generic dual-system theory” (Evans, 2008; p. 258). For example, it has been proposed that a fast-binding memory system and a slow-learning system operate within, if not also across, all of the various psychological domains.

“We would also like to suggest that the dual-memory system interpretation also applies to implicit and explicit measures of other phenomena, assuming that the implicit measure represents automatic processing while the explicit measure represents conscious processing” (DeCoster, Banner, Smith & Semin, 2006; p. 18).

It follows from a literal interpretation of dual processes that different implicit measures of a particular psychological domain (e.g., aggression) should converge as alternate representations of a single underlying unconscious process (see for example

Fazio & Olsen, 2003; Greenwald & Farnham, 2000; Bosson, Swann, and Pennebaker, 2000). However, the literal interpretation may be incomplete. It is argued in this study that two independent processes are too few to accurately portray the empirical relationships observed among distinct implicit measures of personality. There may be more than one independent implicit personality process.

The remainder of this paper develops this proposition. It first outlines a set of standards to demonstrate the independence between two personality processes. With these standards in mind, it looks at evidence for dual processes found in research that compares different implicit and explicit personality measures. In the same light, it reviews and critiques studies that compare different implicit personality measures to each other. It describes a study which tests hypotheses that at least two implicit processes are involved in aggression. These processes are not only independent of explicit measures, but are also independent of each other.

Standards to Establish Independent Personality Processes

What evidence will be accepted to demonstrate that two personality measures represent independent personality processes? Bornstein (2002) recommended the process dissociation procedure, originally developed in teasing apart implicit and explicit processes in memory and learning. This procedure establishes three standards to differentiate independent processes. First, the two measures should have no more than moderate intercorrelations – in the range of .20 to .40. Higher correlations would suggest the measures simply assess the same or substantially similar processes. Second, both

measures should predict domain-relevant criteria. Should the two measures predict different behaviors it would represent stronger evidence that different processes are involved. Finally, the predictions of the two measures should be differentially affected by moderating variables. A moderating variable should affect scores on one type of test but not the other, or a moderator should affect scores on the two types of tests in different ways. Such interactions indicate that the two systems rely on and operate on different information in the performance situation.

Stated simply, three rigorous standards to establish independent personality processes result from this analysis: (1) lack of intercorrelation, (2) prediction of different domain-related criteria, and (3) differential moderation of their validities. According to Bornstein (2002), if two personality variables meet these standards, one may logically conclude that the measures represent separate and distinct personality processes. In the sections that follow, these standards will be applied to a review of research addressing the differentiation of processes represented by various explicit and implicit measures of personality.

CHAPTER 2

DUAL PROCESS THEORIES IN PERSONALITY

Three approaches to the implicit measurement of personality provide evidence for dual personality processes: the Thematic Apperception Test (TAT; Morgan & Murray, 1935), the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998), and the Conditional Reasoning Test (CRT; James, 1998). The evidence suggests the implicit measures TAT, the IAT, and the CRT represent different processes than those represented by explicit measures. Before discussing this evidence, explicit measures and each implicit measure are introduced, and the cognitions they assess are described.

Explicit Components Personality

Explicit measures of personality assume that people can accurately observe, recall, and describe their personalities. Examples include the Jackson Personality Form (PRF; Jackson, 1984), the California Psychological Inventory (CPI; Gough, 1987) and the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). These measures employ direct assessments like questionnaires and surveys which rely on self-reports. Participants consciously evaluate a series of self-descriptive propositions such as “I easily become angry when frustrated.” This is viewed as an introspective process, because participants “must turn their attention inward to determine whether their experience corresponds to the statement in a test item” (Bornstein, 2007, p. 365).

Therefore, the cognitions assessed by explicit measures represent *introspections*, *conscious self-evaluations*, or *self-attributions*. The term *self-reports* is often used.

Implicit Components Personality

Measuring nonconscious processes is not so straightforward. The final outputs of a nonconscious process – choices, recollections, words, actions – may be consciously observed or expressed (see James, McIntyre, Glisson, Green, Patton, LeBreton, Frost, Russell, Sablynski, Mitchell, & Williams, 2005, Figure 1). However, the impetus for these behaviors may be unreportable, unknowable, and misattributed to other causes (Nisbett & Wilson, 1977). Critical factors for understanding personality and behavior, such as latent motives and defense mechanisms, are thought to be either too threatening to permit accurate self-report (Murray, 1938) or outside of one's awareness (McClelland, 1951). Consequently, it is imperative to assess nonconscious processes by indirect observation of behavioral indicators that are normally unavailable to consciousness (Greenwald & Banaji, 1995; James, 1998).

Thematic Apperception Test

The TAT is a traditional projective test. It requires researchers to infer personality characteristics from free responses to standard pictures of people in ambiguous interactions (Murray, 1938). Participants follow standard instructions to construct brief stories about each picture. Researchers then identify subjective themes and score them according to “coding books” developed through the analysis of known groups

(McClelland, Atkinson, Lowell, & Clark, 1958). What this reveals was thought to be a function of the Freudian defense mechanism of projection, hence the term projective test.

Murray (1938) later assumed that personality-dependent interpretative processes (i.e., apperception) influence the unconscious themes expressed in TAT stories. People with high levels of an implicit motive are thought to be highly sensitive to and preoccupied with the goal of taking advantage of generalized cues that signal natural incentives for that motive (McClelland, 1985). This concern affects the activation and articulation of themes attributed to ambiguous stimuli (Weinberger & McClelland, 1990). Current views hold that the response to ambiguous stimuli is guided by unconscious classification into a priori interpretative themes. In other words, the stimuli embodied in TAT pictures are unconsciously differentiated and assigned meaning according to one's pre-existing system of categories (Bornstein, 2007). The cognitive mechanisms engaged by the TAT may be described as *unconscious preoccupations, concerns, or goals*.

The Dissociative Hypothesis. McClelland, Koestner, & Weinberger (1989) proposed that scores on self-reports and the TAT represent separate personality systems. As evidence, the authors cited one of the earliest studies to compare TAT and self-report measures of the achievement motive (deCharms, Morrison, Reitman, & McClelland, 1955). The implicit and explicit measures were not correlated, and they predicted different behaviors. TAT scores significantly predicted performance on an anagram task and the holding of office, whereas self-reports predicted neither. In contrast, self-reports, but not the TAT, predicted conforming one's art judgments to an expert's opinion. The authors concluded that TAT and self-reported motive measures "*produce two different scores which signify different things as far as the rest of the subject's behavior is*

concerned” (p. 422). McClelland, et al. (1989) went on to argue that self-reports predict behaviors and choices in short-term situations when social incentives are present (Ajzen & Fishbein, 1970; Bandura, 1982). In contrast, they argued implicit motives predict longer term outcomes such as entrepreneurial behavior (McClelland, 1965; McClelland, 1987), and managerial success (McClelland & Boyatzis, 1982) in the absence of socially-conveyed incentives.

A study by Biernat (1989) found that TAT achievement motivation was not significantly correlated the Edwards Personal Preference Schedule (EPPS; Edwards, 1957) or the Rokeach Value Survey (RVS; Rokeach, 1973). The TAT predicted solving math problems whereas EPPS and RVS scores did not. However, EPPS scores predicted who said they would lead a group if asked, but TAT scores did not. The TAT and RVS measures of affiliation were also uncorrelated. A group with high RVS affiliation scores chose more affiliation goals than a group high on RVS achievement scores. Conversely, the group high on RVS achievement chose more achievement goals than the affiliation group. In contrast, TAT measures of achievement and affiliation were unrelated to goal choices.

In two experiments Koestner, Weinberger, and McClelland (1991) found TAT and corresponding PRF measures were uncorrelated for achievement and power motivation. The measures were also related to different behaviors. Using a median split for the distribution of both PRF and TAT scores, ANOVA revealed a significant interaction in which high TAT and the PRF scores led to recall of different types of words in a memory task. Those high in self-reported need for achievement recalled achievement-related words better than unrelated words. Those high in implicit

achievement motivation, in contrast, recalled fewer achievement-related words compared to other words. On the other hand, those high in implicit power were more accurate in identifying supervisors and employees in photographs compared to those low in implicit power motivation, but self-reported power motivation was unrelated to performance on this task. In addition, the PRF and TAT measures were found to differentially interact with incentive conditions. ANOVA revealed a significant interaction in which those with high self-reported achievement scores recalled more words when expectations were high compared to neutral expectation. Low self-reported achievement had the opposite effect on recall. In contrast, differences in expectations did not interact with the implicit need for achievement. The authors concluded that for both achievement and power motives, self-reported and the TAT scores are uncorrelated, related to different behavioral outcomes, and “triggered by qualitatively different aspects of the environment” (p. 79).

A meta-analysis by Spangler (1992) found that TAT and self-report measures of achievement motivation share less than 1% of their variance. The TAT was found to be a better predictor of spontaneous achievement behavior such as task performance and social behavior as well as long-term outcomes like income, sales success, promotions, and leadership roles. In contrast, self-report measures were found to be better predictors of other explicit measures of attitudes, opinions, grades, personality, and other test scores. In addition, the type of incentive moderated predictions. The TAT was found to predict spontaneous achievement behavior “extraordinarily well” (p. 150) in the presence of activity incentives. Self-report measures were found to predict spontaneous achievement behavior in the presence of explicit social incentives.

In summary, the *dissociative hypothesis* was supported by correlational, experimental, and meta-analytic studies comparing TAT and self-report measures. Each provided evidence in line with the process dissociation procedure to suggest separate personality systems. The TAT and self-reported assessments were found to be uncorrelated. They predicted different types of behavior. And their relationships with criteria were affected differently by environmental cues.

Conditional Reasoning Test

The Conditional Reasoning Test of Aggression (CRT-A) measures the tendency to use latent reasoning biases called justification mechanisms (JMs) “whose purpose for aggressive individuals is to enhance the logical appeal of their behavioral choices” (James, 1998, p. 131). JMs promote feelings of frustration, anger, peril, resentment, and loss of dignity. This provides a context for aggressive individuals to portray themselves as victims of hostility, exploitation, inequity, and degradation. It also allows aggressive individuals to perceive their behavior as reasonable and socially appropriate. JMs thus serve to rationalize the aggressive motive and its consequences.

CRT-A items are similar to those of standardized reasoning tests. However, aggressiveness JMs are mapped to one of two logically correct alternatives for each item. This alternative appeals to the biased reasoning of aggressive individuals, whereas the remaining logical alternative appeals to nonaggressive individuals. In summary, the cognitive mechanisms engaged by the CRT-A are *unconscious reasoning biases*, *rationalizations*, and *justifications* favoring one’s aggressive behavior.

CRT and self-report measures of aggression typically dissociate in relation to each other and different criteria (James, 1998; James & Mazerolle, 2002; James, et al., 2005). They typically share little variance and often differ in their predictions of aggression. For instance, 11 empirical validation studies produced an average correlation of .14 between CRT and self-reports scores (James, et al., 2005). The CRT predicted criteria such as lying, conduct violations, performance ratings, grievances, theft, and fights and fouls in intramural basketball games with a mean validity of .44. In contrast, self-report validities averaged .21. Furthermore, dominance analysis (Budescu, 1993) revealed that CRT scores contributed relatively more than self-report scores to the overall explanation of aggressive behavior. The CRT contributed 74% to 83% of total R^2 , outperforming self-reports across all possible subsets regression models including both predictors. The two types of tests often predict different behaviors. Kelly & Lee (2009) examined six studies of aggression that compared the CRT and self-reports. The predictors were statistically different (Steiger, 1980) for six of twelve aggressive behavioral criteria.

In summary, two standards of the process dissociation procedure have been demonstrated for the CRT in relation to self-reported measures of aggressive disposition. The two types of measures correlate poorly with each other. And they differ in their predictions of objective measures of aggressive behavior, with the CRT being more dominant in prediction. It is noteworthy that thus far, no study has addressed differential moderation of the predictions of the CRT and self-reports.

Implicit Association Test

The IAT uses differences in reaction time (RT) in a double categorization task to measure the strength of implicit association between two concepts. It assumes that highly associated concepts are processed faster than poorly associated concepts. To assess self-concept, it relates the “self” to various dispositional concepts (Greenwald & Farnham, 2000). For example, to assess aggressive self-concept, four conceptual categories are created: Self, Others, Aggressive, and Prosocial. Each category is represented by exemplars (e.g., help, nurture, discuss, and befriend for the prosocial category). The exemplars are randomly presented, and participants rapidly sort them into a self + prosocial or an other + aggressive category. Participants then sort the same stimuli into self + aggressive or other + prosocial categories. Scores are based on differences in average RT between the two conditions. This indicates the position of one’s self-concept on an idiosyncratic aggressive ↔ pro-social dimension. Faster RT indicates stronger automatic self-association. The cognitive mechanism engaged by a self-concept IAT can be described as relative strength of *automatic self-associations*.

Research using the IAT reveals findings consistent with the standards of the process dissociation procedure. First, IAT and self-report measures of personality correlate poorly. The first study to compare IAT and explicit measures of self-esteem found an average correlation of .17 between four self-report measures and two IAT measures (Greenwald & Farnham, 2000). Second, recent meta-analyses found average shared variance of less than 5% between IAT and self-report measures of personality (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Greenwald, Poehlman,

Uhlmann, & Banaji, 2009). Third, IAT and self-report measures of personality predict different behaviors. Several studies showed that IAT self-concept measures significantly predicted trait-related behavior, whereas self-reports did not. Egloff & Schmukle (2002) found this pattern for ratings of nervous hand movement and anxiousness. Steffens and Schulze-König (2006) found that IAT self-concept measures of neuroticism, extroversion, agreeableness, and conscientiousness respectively predicted self-reported and observer-rated stress, time spent in social activities, observer-rated agreeableness, and performance on a concentration task. NEO-PI-R measures of Extroversion and Openness respectively predicted self-reported preference for group activities and self-reported attendance of cultural events. Also, the meta-analysis by Greenwald, et al. (2009) showed that the IAT personality measures outperformed self-report measures in their predictions of various criteria. Finally, task difficulty (famous vs. obscure names in a recognition task) was found to differentially moderate self-esteem measured by the IAT and self-reports (Greenwald & Farnham, 2000). Self-esteem measured by an IAT interacted with task difficulty in determining ratings of task importance and future task performance. Task difficulty had no effect on explicit measures.

To summarize, research that has compared explicit and IAT measures of self-concept and self-esteem has demonstrated all three standards of the process dissociation procedure. The different measures produced low intercorrelations, prediction of different criteria, and differential interaction with characteristics of the performance situation.

Summary of Dual Process Evidence in Personality Research

Research using three distinctly different implicit measures have produced evidence for dual processes in personality. In broad support for the dissociative hypothesis of McClelland et al. (1989), the TAT, the IAT, and the CRT lack correlation with each other. Each also predicts different criteria compared to self-report personality measures. Research using the TAT and the IAT showed that they were different than self-reports with respect to interactions with situational variables. The relationship of self-reports to behavior was shown in several studies to be affected by social cues (e.g., instructions), whereas the relationship of the TAT to dependent variables was unaffected by social cues. IAT but not self-report measures of self-esteem were found to interact with task difficulty in determining various ratings of task importance and future task performance. Differential moderation of criterion relationships for CRT and self-report measures of personality has not yet been tested.

CHAPTER 3

EMPIRICAL RELATIONSHIPS AMONG IMPLICIT MEASURES

Most alternatives to traditional implicit (projective) measures were developed only in recent years. Though little research compares distinct implicit measures of personality, a lack of intercorrelation, differences in prediction, and differences in situational moderation are consistently evident.

The CRT and the TAT

One of the first studies to compare distinct implicit measures was described by James (1998). When Smith, DeMatteo, Green, & James (1995) compared TAT and CRT measures of achievement motivation, they found a non-significant relationship between the two measures. They were also differentially correlated with achievement criteria. The CRT predicted grade point average and American College Testing (ACT) scores. The TAT was not significantly correlated with either criteria. James (1998) suggested the lack of correlation might be explained by differences in the way the measures are conceptualized, operationalized, and scored. The TAT taps absolute motive strength revealed through content analysis of free response fantasy stories. In contrast, the CRT bases motive strength on actuarial scoring of standardized responses to reasoning problems. The degree of correspondence between the coding categories of the TAT and the JMs underlying the CRT were also implicated in the lack of correlation.

IAT and Seven Implicit Measures

Bosson, et al. (2000) compared seven implicit measures of self-esteem in single exploratory study. These include an Implicit Association Test (IAT) for self-esteem (Greenwald & Farnham, 2000), a Supraliminal Attitude-Prime Task (Hetts Sakuma, Pelham, 1999), a Subliminal attitude-prime task (Spalding & Hardin, 2000), a Stroop Color-Naming task (Stroop, 1935), an Implicit Self-Evaluation Survey (ISES; Pelham and Herts, 1999), an Initials-Preference Task (IPT) and a Birthday-Preference Task (BPT).

Bosson et al. (2000) found most correlations among the seven implicit measures to be weak and nonsignificant. Only the correlation between the initials preference and the birthday preference tasks was significant. The implicit measures generally failed to predict the criteria, which were explicit ratings of various sorts. Of forty-two possible validities, only six were significant and none exceeded .26.

Most of the implicit measures predicted different criteria depending on presentation order. For example, when it was presented before explicit measures, only the IAT was marginally correlated with judges ratings of competence and self-certainty. When explicit measures came first, however, six implicit measures were marginally to moderately related to at least one criterion. Furthermore, the each implicit measures tended to predict different criteria than the other implicit measures. For example, when preceded by explicit measures the IAT predicted judges' ratings of global self-esteem, and it was marginally related to self-liking. None of the other implicit measures were

related to these two criteria. As noted above, the IAT predicted neither of these criteria when it was presented before the explicit measures.

IAT and Six Implicit Measures

Rudolph, Schröder-Abé, Schütz, Gregg, & Sedikides (2008) conducted three exploratory studies to compare and contrast IPT and IAT measures of self-esteem with newer versions of the initials-preference test along with some other implicit measures. Unlike the IAT which compares two categories (self vs. others), the newer RT measures were designed to assess associations with a single attitude object. These newer measures include the Duplicate Initials-Preference Test (D-IPT) which was developed by the authors, the Extrinsic Affective Simon Task (EAST; De Houwer, 2003), the Identification EAST (ID-EAST; De Houwer & De Bruycker, 2007), the Single-Category IAT (SC-IAT; Karpinski & Steinman, 2006), and the Go/No-Go Association Task (GNAT; Nosek & Banaji, 2001).

Rudolph, et al. (2008) found in their first study that the IPT, the IAT the EAST were not significantly correlated with each other. Their second study examined the D-IPT, the IAT, the SC-IAT, and the ID-EAST. The implicit measures were again uncorrelated. Their third study evaluated two versions of the IAT based on different scoring algorithms and five indices derived from the GNAT including a difference score similar in form to the IAT. They thought structural correspondence between the GNAT and the IAT would yield larger correlations, but none exceeded .27.

The IAT and the TAT

Sheldon, King, Houser-Marko, Osbaldiston, & Gunz, (2007) adapted TAT measures to a format similar to a Power-Intimacy IAT by computing difference scores based on TAT power and intimacy scores. The authors measured life satisfaction, psychological well-being, choices in job and academic preferences, and choices and reasons in consuming or conserving communal resources in a social dilemma task. The Power-Intimacy IAT was weakly related to the corresponding bipolar scores for the TAT. The IAT and the TAT were uncorrelated with most of the outcome variables. The IAT was weakly correlated with choosing to consume communal resources and indicating exploitative reasons for expending those resources. The TAT was uncorrelated with those outcomes, but it was weakly correlated with power-related job choices.

Summary of Studies Comparing Implicit Measures

The combined findings of the studies point to a tendency for implicit measures to behave independently. In short, they dissociate. The CRT and TAT were shown to be independent measures of the achievement motive and to differentially predict achievement criteria (James, 1998). The IAT, several other RT measures, two implicit preference tasks, and a projective measure of self-esteem were found to be poorly correlated, to predict different criteria, and to respond differently to contextual cues in their predictions (Bosson, et al., 2000). Furthermore, the IAT and several related measures of self-esteem had low intercorrelations, even when conceptual similarity,

scoring differences, individual differences, and random error were controlled (Rudolph, et al., 2008). Finally, IAT and TAT measures of power-intimacy were uncorrelated and predicted different preferences and behavioral choices (Sheldon, et al., 2007).

Common Expectations of Convergence

Findings that suggest separate and distinct implicit personality systems are troubling for researchers expecting significant overlap in variance, process, and predictions. The following comments typify this viewpoint:

“[D]isappointingly, the seven measures of implicit self-esteem were not positively correlated with one another” (Greenwald & Farnham, 2000, p. 1035).

“(W)e find the lack of intercorrelations among implicit self-esteem measures to be worrisome, both theoretically and empirically.” (Bosson, et al., 2000, p. 640).

“One of the most disturbing trends to emerge in the literature on implicit measures is the many reports of disappointingly low correlations among the measures” (Fazio & Olsen, 2003, p. 311).

These sentiments reflect an expectation that different implicit measures of the same personality domain will follow a pattern of convergent validity. Substantial shared variance is expected, because different implicit measures are assumed to tap a common source of variance and to represent a common implicit construct. It follows from the literal interpretations of dual processes that different implicit measures of a particular psychological domain (e.g., aggression) should converge as alternate representations of a single underlying unconscious process. However, the literal interpretation seems incomplete.

A Different Perspective

Divergence among different implicit measures may be due to divergence among the underlying cognitive mechanisms they represent. For instance, agreement across dual process theories is not complete, and even what to call these systems is a subject debate. A number of labels have been proposed, including such terms as controlled/automatic (Schneider & Shiffrin, 1977), self-attributed/implicit (McClelland, et al., 1989), explicit/implicit (Greenwald & Banaji, 1995), rational/experiential (Epstein , 1994), System 1/System 2 (Kahneman, 2003), and many more. The particular terms generally reflect the novel elements and emphases of the various accounts. They also reflect debates about the unique implicit characteristics championed by the individual theories (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Samuals, 2006).

More to the point of this study, some suggest a more complex implicit system involving multiple independent implicit processes. For example, Roser & Gazzaniga (2004) in the field of brain research suggest that a complex of circumscribed modular processes occupy distinct neurological locations, operate automatically, and operate outside of conscious control. In a similar vein, Stanovich (2004) in the field of thinking and reasoning proposes a single explicit analytical system exercising targeted control over a set of domain-specific implicit systems that operate autonomously and in parallel to each other. Hofmann & Wilson (in press), studying self-regulation in the field social psychology, postulate an explicit system that selectively brings the output of autonomous implicit modules into conscious awareness and allows otherwise independent systems to

selectively share information. However, no research has appeared in personality or other research to test these speculations.

Collectively, this information encourages hypotheses of multiple implicit personality processes that are independent of explicit processes and also independent of each other. Several considerations support this idea. First, the earlier discussion of the cognitive mechanisms theorized to underlie three prominent implicit measures of personality shows that they are operationalized in different ways, and they are theorized to represent distinct concepts. The TAT represents unconscious preoccupations, concerns, or goals. The IAT represents automatic self-associations, and the CRT represents unconscious reasoning biases, rationalizations, and justifications. Second, when compared within the same study, these measures were found to be independent. The relationships of the CRT and the TAT reported by James (1998) indicate independence between the two. Sheldon, et al. (2007) likewise reported relationships that suggest independence between the IAT and the TAT. The relationships between the other implicit measures, criteria, and contextual variables reported by Bosson, et al., (2000) and Rudolph, et al., (2008) also suggest a general independence among implicit measures of personality. Thus, there is reason to suppose that implicit measures behave in relation to each other as they do in relation to explicit measures. The evidence suggests that they behave as measures of independent personality processes.

If different implicit and explicit measures of aggressive personality can be shown to lack correlation with each other and to predict different behaviors depending on the behavior and the stimulus conditions, then, according to the standards of the process dissociation procedure, it might be concluded that each measure represents an

independent personality process. This study tests these possibilities by examining the predictions and the situational moderations of one explicit measure, the Anger-Hostility scale of the NEO-PI-R (NEO-AH), and two contemporary implicit measures, the CRT of Aggression (CRT-A) and an Aggressive Self-Concept IAT (IAT-A). Participants play a popular computer game under incentive and non-incentive conditions. Four criteria were chosen to represent aggressive behavior. One was measured in both incentive conditions to assess situational moderation of predictions. Further clarification is provided in the Methods section. But first, the hypotheses of the study are stated below.

CHAPTER 4

HYPOTHESES

The NEO-AH, the CRT-A the IAT-A are generally predicted to (1) intercorrelate poorly, (2) to respond differently in the predictions of aggressive behavior when incentive conditions change, and (3) to differ in their predictions of the four behavioral criteria of aggression. These are presented as specific hypotheses below.

Hypothesis #1. The NEO-AH, the CRT-A and the IAT-A will intercorrelate in the range of .20 to .30 or lower.

Hypothesis #2. The NEO-AH, the CRT-A, and the IAT-A will differ in the moderation of their validities by different incentive conditions.

Hypothesis #2A. The NEO-AH will significantly predict behavior in incentive conditions, but it will not predict behavior in non-incentive conditions.

Hypothesis #2B. The CRT-A will predict behavior the same in incentive and non-incentive conditions.

Hypothesis #2C. The IAT-A will predict behavior the same in incentive and non-incentive conditions.

Hypothesis #3. The NEO-AH, the CRT-A, and the IAT-A will differ from each other in their predictions of each of the four dependent variables.

Hypotheses #3A - #3L. The NEO-AH, the CRT-A and the IAT-A will significantly differ from each other in magnitude or direction in two-tailed pairwise comparisons of their predictions of each of the four behavioral criteria.

CHAPTER 5

METHOD

Participants

Participants came from the participant pool of a large Southeastern university ($n = 194$). They ranged in age from 18 to 30 years with a mean of 20.18, and standard deviation of 1.95. Participants included 54.1% male, 41.8% female, and 4.1% who did not report their gender. Ethnicities of participants were represented by 57.7% white, 24.7% Asian, 6.7% black, 4.1% Hispanic, and 1.5% other. Another 5.2% did not report their ethnicities. Participants earned extra credit applied to a current psychology course, one chance in 1000 to win a \$500 prize, and an extra 0 to 10 chances in 1000 to win based on performance on a modified Tetris game described below.

Materials and Apparatus

Tetris-like game. The popular computer game of Tetris[®] was modified to present two different stimulus conditions. Participants received brief instructions about the game and use of the buttons on the game controller. The non-incentive condition was introduced as a five minute practice session with no influence on chances to win the \$500 prize. The game was played as a normal game of Tetris. Geometric shapes descend on the screen, and participants use buttons on a game controller to arrange the shapes into rows on the bottom of the screen. An incentive condition was created by explaining the

performance-based incentives before beginning the second condition. This phase lasted 20 minutes. The rules and objectives of the game were the same, but the game randomly reversed the effects of some controller buttons. This made the game difficult and frustrating, but not impossible to play.

Measures

Measures included two implicit and one explicit personality measures and four behavioral criterion measures of aggressiveness. The two implicit measures included the Conditional Reasoning Test of Aggression (CRT-A; James, 1998) and an Implicit Association Test for Aggressive Self-Concept (IAT-A; Greenwald & Farnham, 2000). The explicit personality measure was the Aggressive-Hostile Scale of the Revised NEO Personality Inventory (NEO-AH; Costa & McCrae, 1992). Four objective behavioral criteria of aggressiveness were also included: 1) spontaneous pauses in game play during the non-incentive period, and 2) spontaneous pauses in game play during the incentive period. These were unobtrusively recorded by the computer. Also included were two handwritten responses: 3) accuracy in recording game results, and 4) optional written complaints about game procedures.

The Conditional Reasoning Test of Aggression. The CRT-A is comprised of 25 questions. It includes 22 conditional reasoning items to measure aggression and three unscored standard reasoning problems as distracters to strengthen the plausibility of the CRT-A as a test of reasoning abilities. Each aggressive response receives a “+1”, and all other alternatives receive a “0”. Total scores are calculated by summing responses

according to procedures recommended by James and McIntyre (2000). High scores indicate JMs for aggression are influential in reasoning, and implies a cognitive readiness to engage in some form of aggressive behavior. Mid-range scores (e.g., three to six) indicate JMs are only occasionally involved in shaping reasoning. Low scores (e.g., zero to two) indicate JMs are *not* instrumental in one's reasoning. Low scores indicate little implicit readiness or predisposition to engage in aggressive behaviors. James et al. (2005) reports the reliability of the complete 22 item scale comprising the CRT-A as .76 using the Kuder-Richardson Formula 20 coefficient which computes an average item-total polyserial coefficient. Alternate forms reliability is reported to be .83.

The Implicit Association Test. The IAT has been used to assess implicit automatic self-associations such as self-concepts or self-esteem (e.g., Asendorpf, Banse, & Mücke, 2002; Greenwald & Farnham, 2000). An IAT for Aggressive Self-Concept (IAT-A) was constructed using publically available tools and procedures¹. Its concept categories and the thematic content of exemplar words closely match the contrasting aggressive and prosocial motive categories of the CRT-A, which also closely match those used in previous IAT research on Aggression (Blümke, & Zumbach, 2007; Gollwitzer, Banse, Eisenbach, & Naumann, 2007). The IAT-A based its concept categories (i.e., self and others) and the associated exemplars words on those reported by Greenwald, Banaji, Rudman, Farnham, & Mellott, (2002). Four exemplar words were chosen, because that number is in the optimal range reported by Nosek, Greenwald, & Banaji (2007). The

¹ Materials provided by Anthony G. Greenwald, PhD at <http://faculty.washington.edu/agg/iat_materials.htm>.

structure and scoring of the IAT-A were based on recommendations of Greenwald, Nosek, & Banaji (2003).

The IAT-A was combined with a similarly constructed IATs for Dominance Self-Concept and Achievement Self-Concept. These bolstered the cover story, which stated the purpose of the study was to examine the relationships among general personality, reasoning ability, and mental rotation ability.

The IAT is popular, in part, because it achieves greater reliability than most other implicit measures, especially those based on RT. For example, Bosson et al. (2000) reported a split-half reliability of .69 for a self-esteem IAT in contrast to -.05 to .28 for other RT measures of implicit self-esteem. Split-half correlations and alphas for IAT measures typically range from .7 to .9 (Schmukle & Egloff, 2004). For example, four studies with samples ranging from 9,491 to 22,648 produced split-half reliabilities ranging from .89 to .92 (Greenwald & Nosek, 2001). A recent meta-analysis reported an average test-retest reliability of .56 (Nosek et al., 2007).

Anger and Hostility scale of the NEO-PI-R. The Anger and Hostility scale is one of six facets in the NEO-PI-R that are part of the neuroticism factor (Costa & McCrae, 1992). It is an eight item self-report measure that assesses one's self described aggressive characteristics. Respondents rate self-descriptive propositions about their anger and hostility on a 5 point Likert scale. Items include such as "I often get angry at the way people treat me" and "I am known as hot-blooded and quick-tempered."

To further support the plausibility of the study's concern for general personality rather than aggression, the NEO-AH was combined with 21 unscored items of another self-report measure of aggression and 31 additional unscored items unrelated to

aggression. A manipulation check asked 20 participants to describe the purpose of the 60 item self-report measure. Only two noticed that any questions addressed anger or hostility. None could describe the purpose of the study.

Mental Rotation Test. Procedures included an unscored mental rotation test in order to support the cover story. This test included twelve IRT-calibrated mental rotation items of variable difficulty (Embretson, 1997). Items required participants to match an unfolded cube with marks on the facets to the correct one of several similarly marked cubes that might be formed if the target shape were folded into a cube.

Harmful pauses. The researcher informed participants about the functions of the buttons on the game controller, including the pause button which temporarily stops the game. Participants were instructed to avoid use of the pause button, because it might give one an unfair advantage over other participants, it might render their information useless for the study, and it might distort the results of the study. These instructions were intended to make participants think use of the pause button would disadvantage other participants and be harmful to the study. The number of pauses were counted separately for the non-incentive and the incentive conditions.

Inaccuracy in Reporting Game Score. Following the tests and both conditions of game play, participants completed a short questionnaire. It asked participants to record the number of points they had scored in the second tetramino game lasting 20 minutes. Participants were instructed that each point increased chances of winning the \$500 prized by an additional 1 in 1000. The actual number of points for each participant was recorded by the computer. Participants received a 0 for an accurate report and a 1 for an inaccurate score report that was greater than or less than the number recorded by the computer. Both

over reporting and under reporting were considered aggressive responses, because over reporting resulted in unearned chances to win, and under reporting was considered careless and harmful, because it subverted the intent of the scoring system and the study.

Complaints. The questionnaire also asked participants to indicate that they understood the instructions and to provide any comments or recommendations about the procedures. Participants received a 0 for no complaint and a 1 for an indication they did not understand the instructions, a negative comment, or a complaint.

Procedure

Instructions established the pretext that the study was designed to examine relationships among personality traits, mental reasoning, and mental rotation abilities. Additional personality measures assessing nonaggressive constructs reinforced this pretext. This enhanced the appearance of the CRT-A as an inductive reasoning test.

Upon arrival to the lab, the researcher led each participant to a private computer carrel for administration of mental rotation and personality tests. The CRT-A, the IAT, and the NEO-AH measures were alternated in balanced order, but the mental rotation test always occurred last. Participants entered another carrel for the Tetris game. The researcher launched the game and made sure the participants understood how to operate the controls and score points in the game. The researcher informed participants that they would first play a practice game followed by a game that determined their chances to win the \$500 prize. Following this game, participants wrote down the number of four-line eliminations they achieved in the second conditions, and completed a brief demographic

questionnaire which asked if they understood the instructions and if they had additional comments about study procedures. Participants were then given the option of immediate or emailed written debriefing with full disclosure information.

CHAPTER 6

RESULTS

Analyses

Table 1 displays the means, standard deviations, and intercorrelations of the independent and dependent variables. Reliabilities of the independent variables estimated in this study appear on the diagonal of Table 1.

Table 1: Means, standard deviations, and intercorrelations^a of the predictors and criteria

	M	SD	1	2	3	4	5	6
1. CRTA	4.60	2.18	.69 ^{b*}					
2. IAT-A	.32 ^a	.33	.09	.77 ^{c*}				
3. NEO-AH	20.80	5.16	.05	.06	.79 ^{d*}			
4. Pauses – Non-Incentive ^e	.13	.45	-.36*	-.02	.04	--		
5. Pauses – Incentive ^f	.17	.37	-.35*	.12	.25*	.36*	--	
6. Incorrect Score Report ^g	.27	.45	-.11	.32*	.16*	.16*	-.08	--
7. Complaints about Instructions ^h	.10	.30	.16*	.09	.01	-.14	.02	-.31*

* $p < .05$

^a Intercorrelations of predictors are product moment correlations. Remaining correlations are polyserial correlations except as noted.

^b KR-20

^c Guttman Split Half

^d Cronbach's alpha

^{e, f} Scored as 0 = no pauses in game; 1 = one or more pauses in game

^g Scored as 0 = accurate report of game score; 1 = under report or over report of score

^h Scored as 0 = no written complaint; 1 = written complaint about procedures

Descriptive Statistics for the Independent Variables. Mean participant scores on all three predictors indicated mild to moderate levels of aggressiveness in the sample.

Reliabilities. The Kuder-Richardson Formula 20 produced a reliability estimate of .69 for the CRT-A. A Guttman split-half reliability of .77 was computed for the IAT-A. Cronbach's Alpha produced reliability estimate of .79 for the NEO-AH. These reliabilities proved to be adequate for further analysis.

Intercorrelations of the Dependent Variables. All four criteria represent low base rate phenomena with highly skewed distributions. Accordingly, they were dichotomized, and polyserial correlations were computed using PRELIS 2.8 (Jöreskog & Sörbom, 2006). Each accounted for less 13% of the variance in any other dependent variables. Thus, they appear to represent distinct forms of behavior.

Hypotheses

Hypotheses were based on the standards of process dissociation procedure (Bornstein, 2002). If the NEO-AH, the IAT-A, and the CRT-A represent different personality processes, they should intercorrelate poorly, differ in their moderation by situational cues, and differ in their predictions of behavioral criteria of aggressiveness.

Hypothesis 1: Lack of Intercorrelation among the Predictors. The predictors produced relatively normal distributions, although the CRT-A was slightly skewed. Thus, product moment correlations assessed relationships between each pair of the aggression predictors. Table 1 presents these findings. As predicted, each implicit measure lacked

significant correlation with the explicit measure of aggression. More noteworthy, as predicted, the two implicit measures of personality shared no significant variance.

Hypothesis 2: Inequalities in Predictions in Different Incentive Conditions.

Hypotheses 2A through 2C anticipate differences in predictions of game pauses across the two incentive conditions. Rows 4 and 5 of Table 1 show the validities for each predictor in both incentive conditions. In order to compare these correlations, two problems require remedy. First, limits to the experiment-wise Type I error rate are required. Second, in order to compare the correlations of two variables with a third, the covariance between the two variables must be accounted for (Steiger, 1980). Therefore, a two-step procedure was used.

The first step applied an omnibus test of the equality of the validities. This is analogous to an omnibus test in analysis of variance prior to planned comparisons (Larzelere & Mulaik, 1977). It used structural equation modeling (SEM) software (LISREL; Jöreskog, & Sörbom, 2006) to simultaneously test each pair of validities. The covariances between each predictor and dependent variable were constrained to equality without specifying a value (Cheung & Chan, 2004; Preacher, 2006). This created a model of equivalent validities where each constraint comprised a test of differences in validities. The overall test produced a significant goodness of fit statistic ($\chi^2 = 10.17$; $df = 3$; $p = .017$; RMSEA = .11). Thus, the model of equivalent validities was rejected. As predicted, at least one significant difference in validity across incentive conditions was detected.

The second step determined if the explicit and implicit measures dissociate in the moderation of their predictions by changes in incentive conditions. This involved three two-tailed t-tests to separately test hypotheses 2A, 2B, and 2C. To maintain the overall

Type I error rate at the nominal level ($p = .05$), Bonferonni corrections were made to the alpha level for each test ($p = .05/2/3 = .008$, critical $t = \pm 2.58$).

Hypotheses 2A, 2B, and 2C: Validities of the NEO-AH will vary by incentive conditions, but the validities of the CRT-A and the IAT-A will not vary. These are pairwise comparisons made column-by-column for the validities on rows 4 and 5 of Table 1. Each used a t-test for differences between two correlations that share an index. Steiger (1980) referred this test as $T2$, recommending it above tests formulated by Peters & Van Voorhis (1940), Hotelling (1940), and Dunn and Clark (1969) due to its superiority in meeting its distributional assumptions in small and large samples. Table 2 presents the results. As predicted, the validities of the NEO-AH varied significantly with changes in incentive conditions, ($T2 = 6.47$; $p < .008$), but no significant differences were seen for the CRT-A ($T2 = 1.36$; ns) and the IAT-A ($T2 = 1.31$; ns).

Table 2: $T2$ values for significant differences in the validities of the implicit and explicit predictors in predicting Game Pauses in different incentive conditions

CRITERION	NEO-AH	CRT-A	IAT-A
Game Pauses in Non-Incentive Conditions	6.47*	1.36 ns	1.31 ns
Game Pauses in Incentive Conditions			
* Steiger's $T2$ t-test ($p < .008$)			

Hypothesis 3: The NEO-AH, the CRT-A and the IAT-A will significantly differ in their predictions of behavior. A complete test involves 12 pairwise comparisons made row-by-row for the validities seen in Table 1. The two-step process using LISREL and the $T2$ test was again used. The covariances between each of three predictors and each dependent variable were constrained to equality to create a model of equivalent validities.

This produced a significant goodness of fit test ($\chi^2 = 82.03$; $df = 8$; $p = 0.00$; RMSEA = .20). The model of overall equivalent validities for every predictor predicting every behavioral criterion was rejected. Thus, as hypothesized, at least one significant difference was detected in the simultaneous comparisons of validities of the predictors across all of the criteria.

This result justifies row-by-row pairwise comparisons for the validities seen in Table 3. This involves twelve two-tailed t-tests labeled as Hypotheses 3A through 3L. To maintain the overall Type I error rate at the nominal level ($p = .05$), Bonferonni corrections were made to the alpha level for each separate test ($p = .05/2/12 = .002$, critical $t = \pm 3.09$). Each comparison applies the T2 test of dependent correlations.

Hypothesis 3A thru 3L. Table 3 summarizes the set of T2 tests of Hypotheses 3A – 3L. It can be seen that five of the twelve hypotheses were supported by the analysis.

Table 3: T2 values for tests of dissociations among implicit and explicit predictors in predicting the same criterion

CRITERION	CRT-A vs. IAT-A	CRT-A vs. NEO-AH	IAT-A vs. NEO-AH
Game Pauses in Non-Incentive Condition	-3.63*	-4.17*	-0.56
Game Pauses in Incentive Condition	-5.04*	-6.53*	-1.32
Incorrect Score Report	-4.52*	-2.72	1.60
Complaints	0.67	1.51	0.85

* $p < .002$; critical two-tailed $T2 = \pm 3.09$

The CRT-A and the IAT-A differed significantly in their predictions of Game Pauses in Non-Incentive and Incentive conditions. The CRT-A and the IAT-A did not differ significantly in their predictions of Complaints. The CRT-A and the NEO-AH

differed significantly in their predictions of Game Pauses in Non-Incentive and Incentive conditions. The CRT-A and the NEO-AH did not differ significantly in their prediction of Incorrect Score Report or Complaints. The IAT-A and the NEO-AH did not differ significantly in their predictions of any of the behavioral criteria of aggression. Finally, the CRT-A, the IAT-A, and the NEO-AH did not differ in their predictions of Complaints.

CHAPTER 7

DISCUSSION

The results support a model of aggressive personality that incorporates at least two implicit processes independent of each other as well as the explicit process, but the evidence is incomplete. It supports a complete dissociation between the CRT-A and the NEO-AH, because they were uncorrelated, differentially moderated by incentive conditions, and otherwise predictive of different behaviors. It suggests the IAT-A and the NEO-AH represent independent personality processes that differ in their response to incentives, but it raises questions about the lack of differentiation in their predictions. Importantly, it also suggests the CRT-A and the IAT-A represent independent implicit personality processes that contribute to different aggressive behaviors regardless of incentive conditions. But it leaves questions about what conditions moderate predictions of implicit measures. The following sections interpret and elaborate upon these results, address the niggling questions, and suggest future directions for research.

Dissociation of the CRT-A and the NEO-AH

The analysis provided strong indications that the CRT-A and NEO-AH represent separate personality processes. They met all of the standards of the process dissociation procedure. They lacked correlation, they differed in moderation of their predictions by incentive conditions, and they statistically differed in the prediction of aggressive criteria. These findings replicate findings of previous research comparing CRT measures to

explicit measures (James, 1998; James & Mazzerolle, 2002; James, McIntyre, Glisson, Bowler, & Mitchell, 2004; James et al., 2005; Kelly & Lee, 2009). Differences in situational moderation have now been added to the evidence. It was shown for the first time that, unlike the NEO-AH, the predictions of the CRT-A were unaffected by the introduction of incentives. The implicit processes of the CRT-A and the explicit processes of the NEO-AH appear to represent independent personality processes. Implicit reasoning biases that justify aggression and conscious aggressive self-attributions seem to operate independently of each other with respect to their intensity, their relationship to aggressive behavior, and their response to incentive conditions.

Dissociation of the IAT-A and the NEO-AH

The results partially supported the hypothesis that the IAT-A and NEO-AH represent separate personality processes. They met two of the standards of the process dissociation procedure. They were uncorrelated, and they differed in moderation of their predictions by incentive conditions. Unlike the NEO-AH, the IAT-A was not moderated by incentives. Surprisingly, they did not statistically differ in their prediction of any of the criteria, a finding inconsistent with the literature. Comparisons encountered in the literature, however, were not so stringent in their tests of dependent correlations, typically basing comparisons on visual inspection. They lack correlation, respond differently to incentives, but predict the same behaviors. Future research should examine this further.

What the IAT measures is unclear. It has been suggested that the processes leading to IAT scores incorporate both automatic and controlled processes (De Houwer,

et al., 2009; Nosek, 2005; Nosek, et al., 2007; Greenwald, et al., 2009). It is also unclear whether the processes underlying the IAT measure implicit associations, competition among automatic responses, or unconscious cultural stereotypes (Arkes & Tetlock 2004).

Metric Arbitrariness. The IAT has sustained criticism for metric arbitrariness, because the relative intervals, the meaning of a one-unit change, and the location of the observed scores on the continuum of interest are not specified (Blanton & Jaccard, 2006). With reference to this study, the zero point of the IAT-A is based on differences in RT for different concept-attribute combinations. The zero point obtained in this manner differentiates aggressive and prosocial self-concept scores within each individual. However, differences in the psychometric properties of the conceptual categories (i.e., aggressive vs. prosocial) and their possible interaction with attribute exemplar words may cause the observed zero point to deviate from the population zero point (Embretson, 2006). In addition, the score intervals may not be equal, and RT may not be linearly related to the construct. Norming the scores also fails to provide sufficient information about individuals' location on the aggressive-prosocial scale. It provides information only about one's position relative to others; it provides no information about what this position means with respect to behavioral indicators of aggression.

The IAT measures something with reliability, and it predicts some behavioral outcomes, but it measures is questionable. In addition the distinction between the two aggressive processes may be questioned, because they did not differ in their predictions. Nevertheless, the findings suggest automatic aggressive self-associations and conscious aggressive self-attributions operate independently with respect their covariation and response to changes in incentive conditions.

Dissociation of the CRT-A and the IAT-A

The IAT-A and the CRT-A demonstrated two of three classic standards used to establish independent processes. First, the implicit measures were uncorrelated. Correlations between dispositional measures might be attenuated if the measures do not correspond in their content (Fazio & Olsen, 2003; Hofmann, et al., 2005; Nosek, 2005; Schultheiss, Yankova, Dirlikov, & Schad, 2009; also see Ajzen & Fishbein, 1970). The thematic content of concept categories and the exemplar words of the IAT-A were designed to closely match the contrasting aggressive and prosocial motive categories of the CRT-A. Nevertheless, the two implicit measures did not correlate. Automatic aggressive self-associations (IAT-A) and Implicit reasoning biases that justify aggressive behavior (CRT-A) appear to vary with indifference to each other. Second, the CRT-A and the IAT-A differed significantly in predicting three of four behavioral criteria. The IAT-A significantly predicted Inaccurate Score Reports, whereas the CRT-A did not. The CRT-A negatively predicted Game Pauses in both incentive conditions, whereas the IAT-A did not predict pauses in either incentive condition.

The CRT-A and the IAT-A did not meet the third standard of dissociation, which requires differential moderation by situational cues. A subsequent section examines this and the overall pattern of moderation seen in this study. But first, the counterintuitive negative correlation between the CRT-A and harmful game pauses is addressed.

Negative Prediction of Game Pauses by the CRT-A. To be clear, the direction of relationship was not particularly relevant to the hypotheses of this study. All statistical

tests were two-tailed. Nevertheless, a positive relationship between the CRT-A and aggressive behavior is normally expected. However, the results showed that greater use of JMs was associated with less use of the pause button. Why would participants most prepared to justify aggression pause less than those less prepared to justify aggression?

One explanation suggests that those prepared to justify aggression simply disengaged from the performance task when confronted with the difficulty of the task. However, disengagement would also result in a reduction of the other behaviors counted in the study, and this was not the case. These individuals did not stop using other buttons on the game controller. Only pausing showed a negative relationship with CRT-A scores. Therefore, the disengagement explanation does not fit.

A more plausible explanation involves possible differential effects of the instructions based on differential framing. The instructions attempted to establish pressing the pause button during game play as an aggressive response. The pause button was the only one singled out in the instructions. Instructions discouraged use of the pause button, because it might give one an unfair advantage in winning reward, and it might negatively affect the results of the study. However, instructions allowed use of the pause button to adjust one's seating or some similar brief purpose for the sake of comfort. Instructions emphasized that too much pausing could negate one's score. The meaning of "too much" was open to interpretation. This aimed to encourage those with a high implicit readiness to aggress to attempt to harm others while improving their own score.

The instructions may have encouraged the use the pause button by individuals who consciously view themselves as aggressive and prosocial individuals. Those who explicitly described themselves as aggressive used the pause button more frequently than

others, because that meets the normative expectation for aggressive individuals when incentives were in effect. Implicitly prosocial individuals, trusting by nature, suspected nothing, accepted the instructions at face value, and occasionally paused the game as allowed by the instructions.

However, individuals with a high implicit readiness to aggress tend to perceive situations and people with high levels of suspicion. Such participants are inclined to attribute hostile intentions, exploitation, immorality, and hidden agendas to others (James & Mazerolle, 2002). They are highly attuned to real and imagined signs of manipulation by others. These individuals may have implicitly perceived the instructions as a part of a plot to manipulate them into using the button. Their unconscious inclinations sensitized these participants to the possibility that pausing was of interest to the experimenters. Their spontaneous unconscious response was to resist manipulation in order to harm the experimenter. They did so by withholding pausing, the response singled out by the experimenter.

Moderation of Explicit but Not Implicit Predictions by Socially Conveyed Incentives

As described earlier, the Pause criterion was measured in two different conditions. The other two criteria were measured in only one condition, but each can be differentially related to the incentive offered in the study. Inaccurate Score Report was associated with the incentive, because it was directly related to chances to win the prize. Complaints were unrelated to the incentive, because Complaints had no impact on chances to earn the reward. Based on these assumptions, Figure 1 depicts the correlations seen in this study.

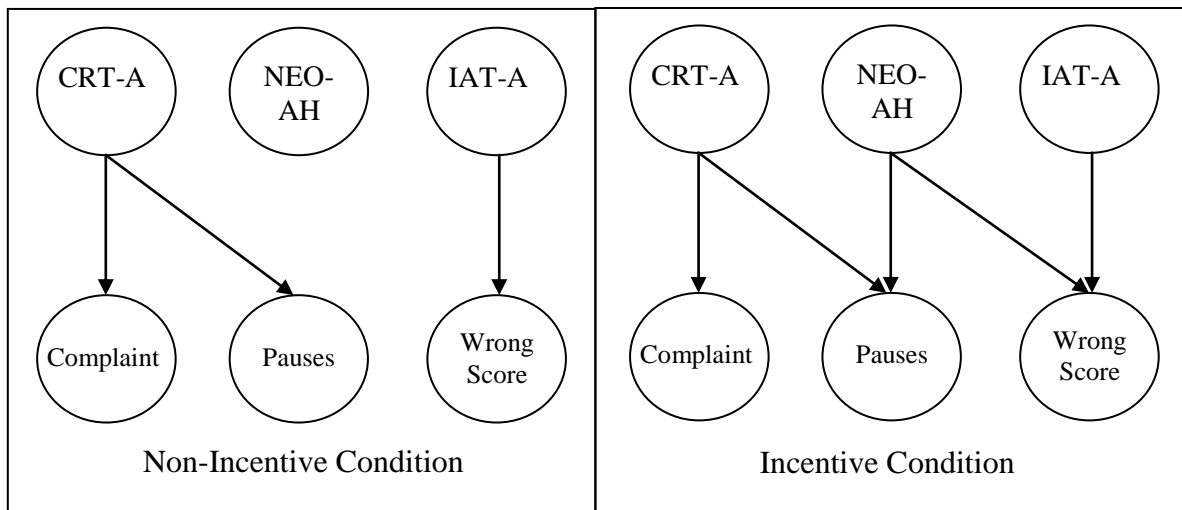


Figure 1. Incentives link explicit but not implicit processes to behaviors

As predicted, criterion relationships of both implicit personality measures were unaffected by differences in incentives, but the explicit measure predicted criteria only in the presence of incentives. Socially communicated cues, expectations, and incentives appear to moderate predictions of explicit measures but not those of implicit measures. Perhaps such cues simply provide the wrong information to engage the implicit personality. If so, what situational cues might differentially moderate the criterion relationships of implicit processes?

Potential Situational Moderation of Implicit Predictions. There is some evidence that certain cues in the performance situation interact with implicit measures in predicting behavior. Earlier we saw that prior presentation of explicit personality measures moderated the criterion relationships of the IAT and other implicit measures (Bosson, et al., 2000). A study by Brunstein & Maier (2005) showed the implicit need for achievement (TAT) interacted with self-referenced feedback to predict vigilance task performance. In contrast, self-attributed achievement scores (PRF) interacted with norm-

referenced feedback to predict task continuation. Thus, the prior activation of processes involved in explicit might affect criterion relationships of automatic self-esteem, while information that activates implicit internal comparisons might affect criterion relationships of unconscious achievement goals.

Schultheiss (2001, 2009) proposed that implicit motives respond to incentives represented and perceived nonverbally (i.e., nondeclarative stimuli), whereas explicit motives respond to incentives perceived in a verbal-symbolic format (i.e., declarative stimuli). For example, facial expressions of emotion seem to engage personality (and brain) processes associated with social motives measured by the TAT (Schultheiss, & Hale, 2007; Schultheiss, Wirth, Waugh, Stanton, & Meier, & Reuter-Lorenz, 2008; Stanton, Hall & Schultheiss, 2010). Additional research may yet identify conditions that changes criterion relationships for one but not another implicit measure.

Dichotomies or Multichotomies in Dissociative Theories?

Explicit, consciously generated measures predicted behavior when task-extrinsic, socially-mediated cues and incentives were in effect. When situational cues were weak or absent, explicit personality was unrelated to behavior, whereas presence of such cues linked explicitly measured personality to behavior. Task-extrinsic social cues (e.g., expectations, norms, incentives) seem to have no impact on the predictions of implicit measures.

What is missing is that we do not fully understand which criteria and which cues are associated with which implicit measure. The pattern of behavioral prediction,

however, is not a dichotomy in which implicit measures predict one kind of behavior and explicit measures predict another kind of behavior. The pattern of behavioral prediction appears to be one of criterion-specific relationship to explicit processes, which can be overridden by engaging explicit personality processes through socially communicated, task-extrinsic cues. In other words, explicit measures can predict the same behaviors as implicit measures if incentives are in effect.

Dichotomies of behaviors such as, automatic vs. controlled, operant vs. respondent, or spontaneous vs. deliberate get it half-right. They tell us the conditions under which explicit measures will predict which behavior, but they cannot tell us which kind of behavior will or will not be related to which specific implicit measure in which specific condition. The implicit half of dual process theories needs to be further elaborated according to the varieties of implicit processes, which seem to predict only certain and sometimes mutually exclusive behaviors.

Conclusions

The results of this study provided evidence of dissociation between the implicit processes measured by the CRT-A and the IAT-A. Unconscious reasoning processes that justify aggression appear to operate independently of automatic self-associations with aggression. Furthermore, this study replicates common findings of dissociation between the CRT-A and explicit measures. Unconscious reasoning processes that justify aggression appear to operate independently of conscious self-attributions of aggression. If supported by subsequent research these findings would represent a significant theoretical

contribution to our understanding of the relationships of conscious and unconscious personality processes to each other and to their behavioral outcomes. It introduces the prospect that, depending on conditions, multiple unconscious processes operate independently with respect to each other as well as to an independent conscious process in predicting different domain specific behaviors. We may need a theory that relates multiple independent processes to one another, to conditions, and to criterion variables based on their underlying implicit and explicit cognitive processes.

Limitations and Future Directions

This was not an experiment. Although the situation was manipulated, no random assignment to conditions was effected. In addition, the manipulation of incentive conditions was confounded with the frustrating element of re-mapping the function of the game controller buttons. Although the hypotheses were concerned only with changes in conditions, these effects need to be teased apart. Experimental methods and larger samples would increase our confidence in findings that address the effects of changes in situations upon the relationships of implicit measures to behavioral outcomes.

Potential moderators of the predictions of implicit measures need to be included in future research to test the hypothesis of differential moderation of implicit predictions. In particular, the distinction between IAT measures of personality and explicit measures needs to be clarified. In general, additional implicit measures, such as the TAT, the Differential Framing Test (DFT; LeBreton, 2002), and the Implicit Trait Policy (ITP; Motowidlo, Hooper, & Jackson, 2006). We need to discern any pattern with respect to

implicit processes and a potential typology of behavioral criteria predicted by implicit measures. Is there isomorphism between the implicit processes, evocative conditions, and predicted behaviors? Do different stimuli engage different implicit processes?

Finally, further research is needed to investigate the possibility of not only independent, but also interacting implicit processes (cf., channeling; Winter, John, Stewart, Klohn, & Duncan, 1998; Frost, Ko, & James., 2007; Bing, LeBreton, Davison, Migetz, & James, 2007) including higher order interactions. The evidence for independent nonconscious personality processes uncovered in this research is far from conclusive. However, it would seem to justify, and even indicate, the need for further research to explore this new development in personality research.

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